## Working towards a vision of Diversity and Inclusion in Engineering.

Engineers are good at creating solutions to problems. To addressing challenges and developing ingenious responses. To using their creativity to find ways to succeed. But in their enthusiasm for solutions, they often don't stop to think about whether they have considered all of the things that have an impact on their design – and in particular all of the non-technical requirements that are not specified by the client or potential beneficiary. As a result, proposed solutions often lack the perspectives of people who have not been involved in their development – and in an industry which is notoriously lacking in diversity – this often means that they fail to include the perspectives of women, people with disabilities, the ageing population, and those with other under-represented characteristics.

This Inclusion Framework is for use at the start of the Design phase of an engineering or technology development, to ensure that these perspectives are included. Its use will help ensure that bias and discrimination are not built into the proposed solutions, and its use will help develop creative and enlightened engineers.

The Framework has 8 elements:

1. **Putting People at the Heart of Solutions**
2. **Ethics**
3. **Global Responsibility and Appropriate Technology**
4. **Future Technology**
5. **Societal Impact**
6. **Sustainable Development Goals**
7. **Safety and Cyber Security**
8. **The Natural Environment**

Frame by

Inclusive Engineering Framework

WES — **TOWARDS VISION**
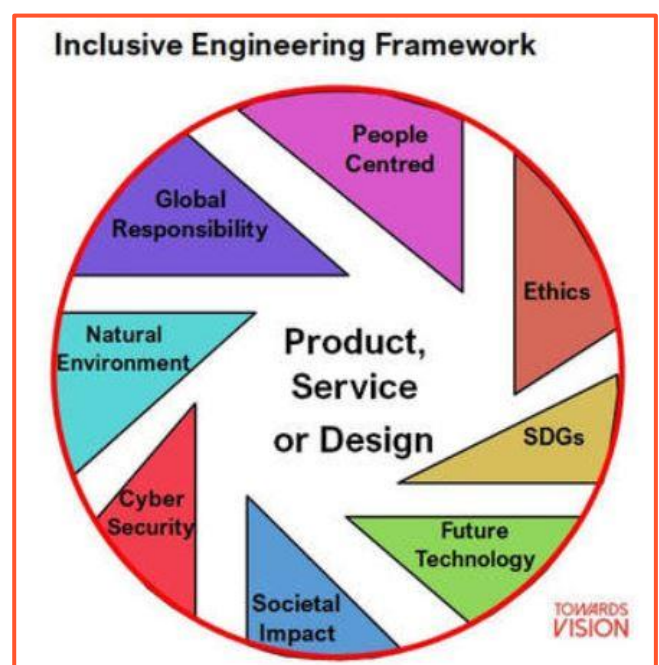
Putting People at the Heart of Solutions

Putting people at the heart of any design or development issue is the basis of human centred design, and will ensure that we start by concentrating on the need rather than jumping to the solution. As an engineering sector we are not equally representative of all sections of the community, so we have to be able to think from the perspective of other people, adopting an inclusive mindset.

Ethics

Our ethical responsibility as engineers is a key behaviour in all aspects of our engineering work, but at the design phase is even more important, as we can be literally designing biases and discrimination into our technological solutions, thus amplifying existing biases.

Global Responsibility and Appropriate Technology

Global responsibility refers to the need to take a perspective that goes beyond national boundaries, and considers things from a much broader viewpoint. Creating engineering and technological solutions in response to disasters or in developing parts of the world requires us to ensure that the technology we use is appropriate to the setting, that strengthens local capability, and does not make the lives of the community members worse.

Future Technology

Many new technologies are currently on the horizon, including digital technologies, artificial intelligence, machine learning, smart and mixed reality solutions and materials, tailored medication, and many more. Often, change happens incrementally, and we build on existing developments, but this is not always the case, and particularly in the developing world it is possible to leapfrog current technology in favour of new technologies that are on the horizon

Societal Impact

In addition to future technology, it is crucial to be aware of societal factors that influence our world both now and those that will become more significant in the future. Current issues such as global pandemics, obesity, the digital divide, food security, gender inequality, and mental health crises are all societal issues that have a relevance to our technological solutions, and developing responses that simultaneously address a number of societal issues represent smart solutions.

Sustainable Development Goals (SDG's)

By considering the SDGs in their entirety we ensure that our solutions are considered from multiple perspectives, and that we are not inadvertently implementing solutions in one area which have detrimental affects in others. Of the 17 sustainable development goals, solutions can be tailored to have positive benefits in multiple areas of development, ultimately leaving no one behind. Tools such as the SDG Impact Assessment Tool (www.sdgimpactassessmenttool.org) or the Social Value Bank Calculator (www.hact.org.uk/social-value-bank) will help give some structure to the assessment of outcomes.

Safety and Cyber Security

Working in a safe way is something that engineers are trained to prioritise, and safety is rightly part of any technological development and workplace behaviour, but the additional long term implications from a cyber security perspective are often not considered at the start of a project, and a failure to consider these could put the solution at serious harm from attack, and endanger lives.

The Natural Environment

Increasingly, the natural environment is becoming more important in our understanding of the need for balance with nature and a sustainable future, and aspects of the natural environment which are often not considered in engineering include the burden we place on the soil, vegetation, air, water and wider ecosystem. As we wake up to the realisation that we need to live in symbiosis with our environment, it is worth considering how our engineering solutions encourage the restoration of natural ecosystems.

For further details on the Inclusion Framework© visit the website
www.towardsvision.org

Contact dawnbonfield@btinternet.com if you would like to find out more.

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